UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/990,798	11/14/2001	Jeffrey P. Grossman	0050.2025-001	3088

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EXAMINER
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ART UNIT	PAPER NUMBER
2187	

DATE MAILED: 08/05/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *14 November 2001*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-65* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-14,17-42,45 and 47-65* is/are rejected.

7) ☒ Claim(s) *15,16,43,44 and 46* is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *14 November 2001* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All   b) ☐ Some *   c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date *2*.

4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

DETAILED ACTION

1.   The enclosed detailed action is in response to the Information Disclosure Statement and

the Application submitted on November 14, 2001.

Claim Rejections - 35 USC § 102

2.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3.   Claims 1-4, 7-8, 12, 14, 17-18, 20-22, 24-32, 35-36, 40, 42, 45, 48-50 and 52-65 are

rejected under 35 U.S.C. 102(b) as being anticipated by Beier (USPN: 5,933,820).

Regarding claims 1-2, 8, 21-22, 29-30, 36, 50, 57, 60 and 62, Beier discloses a memory for

storing objects, the data objects being referenced by pointers (C 8, L 41-45); and a short-quasi-

unique-identifier (SQUID) generator which generates SQUIDs [comprised of a unique identifier

and a reorganization number] for newly allocated data objects to be stored in the memory

segment (C 6, L 25-30; C 12, L 22-25, L 34-39), pointers to a particular data object [target

segment] being associated with the data object's SQUID (C 6, L 55-63); a memory allocator

which allocates a segment of the memory to a data object (inherent – all memory systems

comprise hardware/software control operations to assign/allocate memory to store a data object).

Additionally, regarding claims 60 and 62 refer to C 16, L 5-17; C 19, L 18-31 and C 20, entire.

Regarding claims 3 and 31, Beier discloses if the data object is moved to a second allocated memory segment, placing a pointer to the second allocated memory segment at the original memory segment (C 13, L 42-44).

Regarding claims 4 and 32, Beier discloses the data object is moved (relocated) due to resizing (C 2, L 4-9).

Regarding claims 7 and 35, Beier discloses moving the data object due to data compaction (C 2, L 32-39 – related data objects are compacted by clustering).

Regarding claims 12, 14, 40, 42, 58, 61 and 63, Beier discloses a comparator which compares SQUIDs associated with two different pointers, wherein the comparator determines that the two pointers do not reference the same data object if the SQUIDs [pointer value is invalid] are different; and wherein the comparator determines that the two pointers reference the same data object if the SQUIDs are identical [pointer value is valid] and address fields of the two pointers are identical (C 6, L 63-67; C 7, L 1-12; C 11, L 15-27).

Regarding claims 17 and 45, Beier discloses migration indicators [reorganization numbers] associated with the pointers, a migration indicator indicating a number of migrations of a data object referenced by an associated pointer prior to the pointer being created (C 6, L 53-60; C 9, L 27-29); and a comparator which determines that the two pointers do not reference the same data object [pointer is valid] if their associated migration indicators indicate identical numbers of

migration and their corresponding addresses are different (C 6, L 63-67; C 7, L 1-12; C 11, L 15-27).

Regarding claims 18, 25-26 and 53-54, Beier discloses the migration indicator comprising one bit (the indicator is a count value which is comprised of plural bits and thus comprises bit one).

Regarding claims 20, 27, 48 and 55, Beier discloses the DBMS generating and managing the SQUID, however, software does not operation alone. It must be executed on hardware and thus hardware is used to implement the SQUID.

Regarding claims 21, 28, 49 and 56, Beier disclose the SQUID is implemented by software (Abstract- the DBSM generates and manages the SQUID; and the DBMS is software (C 8, L 52-55).

Regarding claims 24, 52, 59 and 64-65, Beier discloses memory for storing data objects (C 8, L 41-45); pointers to data objects stored in the memory (C 18, L 58-67; C 19, L 1-12); migration indicators [reorganization numbers] associated with the pointers, a migration indicator indicating a number of migrations of a data object referenced by an associated pointer prior to the pointer being created (C 6, L 53-60; C 9, L 27-29); and a comparator which determines that the two pointers do not reference the same data object [pointer is valid] if their associated migration indicators indicate identical numbers of migration and their corresponding addresses are different

(C 6, L 63-67; C 7, L 1-12; C 11, L 15-27). Additionally, regarding claims 64 and 65 refer to C

16, L 5-17; C 19, L 18-31 and C 20, entire.

Claim Rejections - 35 USC § 103

4.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

5.   Claims 5 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier

(USPN: 5,933,820) in view of Black (USPN: 5,325,524).

Beier discloses the limitations cited above, however, Beier does not disclose moving the data

object from a first memory to a second memory within a distributed system. Black teaches

moving a data object from a first memory [C 4, L 44-57 - storesite] to a second memory [C 4, L

44-57 - storesite] within a distributed system (Figure 2, C 4, L 44-45)(C 6, L 1-35). This feature

taught by Black allows data sharing in a multi-node system by forwarding the data to a different

node. Hence, it would have been obvious to one of ordinary skill in the art to use Black's

teachings with the system taught by Beier in a multi-node system for the desirable purpose of

providing data sharing thereby improving the performance of the system.

6.   Claims 6 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier

(USPN: 5,933,820) in view of Flood (USPN: 6,560,619).

Beier discloses the limitations cited above, however, Beier does not disclose moving the data

object due to garbage collection. Flood discloses moving data objects when performing garbage

collections (C 3, L 25-52). This feature allows compaction of data which increases cache hits

and thus improves the performance of the system. Hence, it would have been obvious to one of

ordinary skill in the art to use Flood's teachings with the system taught by Beier for the desirable

purpose of improved performance.

7.   Claims 9 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier

(USPN: 5,933,820) in view of DiLullo (USPN: 5,025,253).

Beier discloses the limitations cited above, however, Beier does not disclose generating the

SQUID by counting. DiLullo teaches the concept of generating a unique identifier via the use of

a counter (C 7, L 17-21). This feature provides a simple method for generating unique

identifiers. Hence, it would have been obvious to one of ordinary skill in the art to use DiLullo's

teachings with to generate the SQUIDs in Beier's system for the desirable purpose of simplicity.

8.   Claims 10 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier

(USPN: 5,933,820) in view of Armstrong (PGPUB: US 20020175805).

Beier discloses the limitations cited above, however, Beier does not disclose generating the

SQUID randomly. Armstrong teaches randomly generating identifiers to ensure uniqueness

Section [0062, lines 8-10]. Beier discloses the use of unique identifier but does not indicate how

the identifiers are generated unique. Hence, it would have been obvious to one of ordinary skill

in the art to use Armstrong's teachings with the teachings of Beier for the desirable purpose of providing an efficient means to generate unique identifiers.

9.   Claims 11 and 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier (USPN: 5,933,820) in view of O'Hare (PGPUB: US 20010027501).

Beier discloses the limitations cited above, however, Beier does not disclose generating the SQUID by hashing. O'Hare discloses generating a unique identifier via hashing (Section [0067, lines 1-3]). This feature taught by O'Hare provides an efficient means for generating unique identifiers. Hence, it would have been obvious to one of ordinary skill in the art to use O'Hare's teachings with the system taught by Beier for the desirable purpose of efficiency.

10.   Claims 13 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier (USPN: 5,933,820) in view of the submitted prior art Luk ("Memory Forwarding :Enabling Aggressive Layout).

Beier discloses the limitations cited above, however, Beier does not disclose a mechanism for reordering instructions wherein the mechanism is responsive to a comparator. However, Luk teaches this feature (refer to Section 3.2 - Data Dependence Speculation). This feature improves performance by reducing data conflicts. Hence, it would have been obvious to one of ordinary skill in the art to use Luk's teachings with the system taught by Beier for the desirable purpose of improved performance.

11.   Claims 19 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier

(USPN: 5,933,820) in view of the submitted prior art Carter (USPN: 5,845,331).

Beier discloses the limitations cited above, however, Beier does not disclose using a guarded

pointer. Carter teaches the use of guarded pointers to protect memory segments (Abstract).

Hence, it would have been obvious to one of ordinary skill in the art use guarded pointers in

Beier system for the desirable purpose of memory protection.

12.   Claims 23 and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Beier

(USPN: 5,933,820).

Beier discloses the limitations cited above, however, Beier does not disclose caching SQUIDs

for recently used pointers. However, caching recently used data/information is well known in

the art. This fearture allows fast access to the information by bypassing accesses to slower

memory. Hence, it would have been obvious to one of ordinary skill in the art to cache the

SQUIDs of recently used pointers in Beier's system for the desirable purpose of improving the

performance of the system.

Allowable Subject Matter

13.   Claims 15-16, 43-44 and 46 are objected to as being dependent upon a rejected base

claim, but would be allowable if rewritten in independent form including all of the limitations of

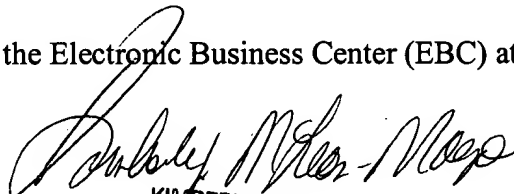the base claim and any intervening claims.

Conclusion

14.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Martin – JP 09034823 – determining if two object references are referencing the same object.

15.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kimberly N. McLean-Mayo whose telephone number is 703-308-9592. The examiner can normally be reached on M (10:00 - 6:30); Tues, Thr (10:00 - 4:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Donald Sparks can be reached on 703-308-1756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

KIMBERLY MCLEAN-MAYO
PRIMARY EXAMINER

Kimberly N. McLean-Mayo
Examiner
Art Unit 2187

KNM

August 2, 2004